

REMARKS

Applicant respectfully requests further examination and reconsideration in view of the arguments set forth fully below. Claims 1-132 were previously pending. Of the above claims, claims 14-24, 36-46, 58-69 and 71-132 were previously withdrawn from consideration. In the Office Action mailed April 28, 2005, Claims 1-13, 25-35, 47-57 and 70 have been rejected. By the above amendment, Claims 1, 25, 47 and 70 have been amended and new Claims 133 and 134 have been added. Claims 1-134 are now pending. Favorable reconsideration is respectfully requested in view of the remarks below.

Request for Consideration of Information Disclosure Statements

The applicants respectfully request that the examiner consider several prior-filed Information Disclosure Statements ("IDS"). Specifically, the two IDS with EFS IDs 57607 and 57608, which were electronically filed on March 23, 2004, the IDS with EFS ID 77023, which was electronically filed on January 28, 2005, and the IDS with EFS ID 77190, which was electronically filed on February 1, 2005, have all not been considered. Accordingly, the applicants request that these IDS be considered and their consideration confirmed along with the next office action. (The IDS with EFS ID 83570, filed electronically on May 4, 2005 has also not been considered, but was submitted before the mail date of the latest office action.)

Rejections Under 35 U.S.C. § 102

Within the Office Action, Claims 1, 2, 4-13, 25, 26, 28-35, 47, 48, 50-57 and 70 have been rejected under 35 U.S.C. 102(b) as anticipated by U.S. Patent Number 6,119,729 to Oberholzer et al. (hereinafter "Oberholzer"). Applicant respectfully traverses this rejection.

The cited portion of Oberholzer describes a freeze protection apparatus for a solar thermal collector. A freeze-protected conduit 14 includes a compressible insert 20 which comprises a compressible elastomeric material that is fully sealed on all its sides and ends by a liquid impermeable membrane 18. Furthermore, Oberholzer discloses using freeze-protected conduits throughout the solar thermal collector:

Every fluid passage in solar thermal collector 50 may be adapted for use with the freeze protection apparatus of the present invention. Referring to FIGS. 6 and 7, a section of a typical fluid passage 80 is shown adapted for use with the freeze protection apparatus of the present invention by defining such fluid passage 80 with flexible conduit 82 wherein flexible conduit 82 is disposed within rigid structural

support member 84. Also disposed within rigid structural support member 84 is compressible elastomeric material 88. [Column 8, Lines 10-19]
The system disclosed in the cited portion of Oberholzer has compressible elements in every portion of the system that can be exposed to cold temperature conditions. These portions are first to freeze during exposure to cold temperature conditions.

Fluid passages between the collector unit 50 and supply line 64 (FIG. 6), including supply manifold 66, and within supply line 64, may be exposed to cold temperature conditions to some extent. The same is true with respect to fluid passages between collector unit 50 and return line 76, including return manifold 74, and within return line 76. In this respect, where such fluid passages are exposed to cold temperature conditions, the corresponding conduit is protected from freeze carnage by the present invention. [Column 8, Lines 46-53]
Thus, the system does not place compressible objects at locations which freeze later. Further, the compressible objects used in Oberholzer include a compressible element and a separate membrane element.

The present invention relates to systems and methods to prevent cracking in a liquid system. These include methods and systems where compressible objects are disposed in enclosures within a liquid system and where the systems are configured to select locations where the liquid begins to freeze in the enclosure, and to arrange for freezing to start from the locations and advance towards the compressible objects. Unlike the present invention, the cited portion of Oberholzer does not disclose or even suggest a system configured to cause a fluid to begin to freeze at selected locations, and for freezing to advance towards one or more compressible objects. In addition, the present invention discloses embodiments in which the compressible objects do not include a separate membrane element, a feature which the cited portion of Oberholzer does not describe. The new claims recite limitations related to this feature.

The amended independent Claim 1 is directed to an apparatus for preventing cracking of a liquid system. The apparatus includes at least one heat exchanger; at least one inlet port extending through a first opening for conveying a fluid to a plurality of channels and passages; at least one outlet port extending through a second opening for discharging the fluid from the plurality of channels and passages; and one or more compressible objects coupled to the inlet and outlet ports in an unpressured condition such that the compressible objects reduce a volume of the inlet port and the outlet port and further wherein pressure exerted on the compressible object increases a volume of the inlet port and the outlet port; wherein, the inlet port and the outlet port are configured to cause the fluid to begin to freeze at locations in each of the inlet port and the outlet port, and for freezing to advance towards the one or more compressible objects. As described above, the cited portion of Oberholzer does not disclose or even suggest a system

configured to cause a fluid to begin to freeze at selected locations, and for freezing to advance towards one or more compressible objects. For at least these reasons, the independent Claim 1 is allowable over the teachings of Oberholzer.

Claims 2-13 are all dependent on the independent Claim 1. As discussed above, the independent Claim 1 is allowable over the teachings of Oberholzer. Accordingly, the dependent Claims 2-13 are all also allowable as being dependent on an allowable base claim.

The amended independent Claim 25 is directed to an apparatus for preventing cracking of a liquid system. The apparatus comprises an enclosure; and one or more compressible objects immersed in the enclosure. Further, the enclosure is configured to cause a fluid to begin to freeze at one or more locations in the enclosure, and for freezing to advance towards the one or more compressible objects. As described above, the cited portion of Oberholzer does not disclose or even suggest a system configured to cause a fluid to begin to freeze at selected locations, and for freezing to advance towards one or more compressible objects. For at least these reasons, the independent Claim 25 is allowable over the teachings of Oberholzer.

Claims 26-35 are all dependent on the independent Claim 25. As discussed above, the independent Claim 25 is allowable over the teachings of Oberholzer. Accordingly, the dependent Claims 26-35 are all also allowable as being dependent on an allowable base claim.

The amended independent Claim 47 is directed to a method of preventing cracking of a liquid system. The system includes one or more pumps and one or more heat exchangers. The method comprises the steps of providing an enclosure; immersing one or more compressible objects in the enclosure; configuring the enclosure to cause a fluid to begin to freeze at one or more locations in the enclosure, and for freezing to advance towards other locations in the enclosure; and immersing one or more compressible objects in the enclosure at the other locations. As described above, the cited portion of Oberholzer does not disclose or even suggest a system configured to cause a fluid to begin to freeze at selected locations, and for freezing to advance towards one or more compressible objects. For at least these reasons, the independent Claim 47 is allowable over the teachings of Oberholzer.

Claims 48-57 are all dependent on the independent Claim 47. As discussed above, the independent Claim 47 is allowable over the teachings of Oberholzer. Accordingly, the dependent Claims 48-57 are all also allowable as being dependent on an allowable base claim.

The amended independent Claim 70 is directed to an apparatus for preventing cracking of a liquid system. The system includes one or more pumps and one or more heat exchangers. The apparatus comprises an enclosure, wherein the enclosure being capable of contracting and

expanding between a minimum volume condition and a maximum volume condition with fluid expansion during freezing, and further wherein the system is configured to cause a fluid to begin to freeze at one or more locations in the enclosure, and for freezing to advance towards other locations in the enclosure. As described above, the cited portion of Oberholzer does not disclose or even suggest a system configured to cause a fluid to begin to freeze at selected locations, or for freezing to advance towards one or more compressible objects. For at least these reasons, the independent Claim 70 is allowable over the teachings of Oberholzer.

Rejections Under 35 U.S.C. § 103

Within the Office Action, Claims 3, 27 and 49 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Oberholzer.

Claim 3 is dependent on the independent Claim 1. As discussed above, the independent Claim 1 is allowable. Accordingly, the dependent Claims 3 is also allowable as being dependent on an allowable base claim.

Claim 27 is dependent on the independent Claim 25. As discussed above, the independent Claim 25 is allowable. Accordingly, the dependent Claims 27 is also allowable as being dependent on an allowable base claim.

Claim 49 is dependent on the independent Claim 47. As discussed above, the independent Claim 47 is allowable. Accordingly, the dependent Claim 49 is also allowable as being dependent on an allowable base claim.

For the reasons given above, Applicant respectfully submits that the Claims 1-13, 25-35, 47-57, 70, 133, and 134 are now in a condition for allowance, and allowance at an early date would be appreciated. Should the Examiner have any questions or comments, the Examiner is encouraged to call the undersigned at (408) 530-9700 to discuss the same so that any outstanding issues can be expeditiously resolved.

Respectfully submitted,
HAVERSTOCK & OWENS LLP

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CERTIFICATE OF MAILING (37 CFR § 1.8(a))

I hereby certify that this paper (along with any referred to as being attached or enclosed) is being deposited with the U.S. Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to the: Commissioner for Patents, P.O. Box 1450 Alexandria, VA 22313-1450

HAVERSTOCK & OWENS LLP.

Date: 8-26-05 By: John D. Lunn